



ADDENDUM LOG

September, 2009

Update to current layout

June, 2011

Plumbing content updated to include Seismic Gas Shutoff Valve (t10)

April, 2012

Changes per TC AVP VP (see documents in center folder)

May, 2012

Changes per TC AVP VP (see documents in center folder)

June, 2012

Updated per TC review

December, 2012

Updated Gas Shut-off Valve language (t11)

March, 2014

Distribution of utilities through exit corridors is prohibited with exception (t24)

October, 2014

Electrical conduit / slab language added (t21, 6)

December, 2014

Wiring language updated (t21, e)

January, 2015

Language regarding the waterproofing membrane on page t10. (t10)

March, 2015

Updated Plumbing content to specific location of water shut off valve to be at eye level. (t11)

March, 2016

Added Electric / Water Sub-meter Requirements (t4)

April, 2016

Added Water Efficiency language (t12)

April, 2017

Updated HVAC VAV Box Terminal Unit Specifications (t21)



Arden Fair Mall

1689 Arden Way, Sacramento, CA 95815

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CONTRACTOR'S RULES & REGULATIONS**

ELECTRIC / WATER SUB-METER REQUIREMENTS

As applicable for property, if there is an existing electric or water sub-meter in the Tenant's space, then the Tenant must have the meter recommissioned to ensure proper installation and functionality. Alternatively, the Tenant can choose to install a new meter that meets Macerich's meter specifications. Either option must be performed by a Landlord-approved electrician and verified by Macerich, and will be at the Tenant's sole cost.

METER SPECS

Tenant may install the meter specified by Macerich or the like. Meter must meet the following criteria:

Electric:

- Meters must be revenue grade.
- There must be at least a 6-digit display.
- Meter must be able to read demand (kW) and usage (kWh).
- The meter must capture the electric usage of the entire Tenant space, including HVAC units. If this is not possible, then it must be noted.
- If using a meter with CTs, note if a multiplier is required and what the multiplier is on the face of the meter.

Water:

- Meter must be properly sized for the water flow in the space. Generally this means the size of the meter should match the size of the water line, or the meter can be 1/4" smaller than the line. This means that if there is a 1" water line servicing the space, a properly sized meter would be 3/4" or 1".

Installation Requirements:

- Meters must be installed by a Landlord approved electrician.
- Installation must be verified and approved by the Operations Manager, or a member of the Operations staff, at the property.
- Proof of inspection must be sent to the Energy Management Department (Alaine Marx, alaine.marx@macerich.com) and should include the following:
 - Date of installation or recommissioning
 - Picture of the meter at time of installation or recommissioning. Picture should be clear and should display kWh and kW legibly.
 - Confirmation that the meter covers whole tenant space.
 - Meter make and model
 - Units that the meter reads in
 - Multiplier, if applicable

MECHANICAL GENERAL REQUIREMENTS

- A. The Landlord will generally provide a shell structure for lease to tenants. Mechanical services will be provided to leased spaces. The Landlord's drawings will indicate the extent and general location of these mechanical services.
- B. The Tenant will be required to utilize the mechanical services provided by the Landlord. The Tenant will be required to complete the mechanical systems within and directly for the leased space including provision for all components and equipment.
- C. Tenant's work shall be subject to provisions, minimum acceptance standards and constraints outlined in this Manual. Tenant's work shall be described in the lease and include the design, installation, extension, completion and performance verification of the following:
 - 1. Variable air volume system where terminal cooling or fan powered heating/cooling units and controls are installed or provided by the Landlord or to the Landlord's specifications, subject to the Tenant's requirements and capacity limitations of Landlord's system. Tenant shall provide complete supply and return air distribution system.
 - 2. Tenant shall provide 24" x 24" access panels in the ceiling within the lease premises at dampers, VAV boxes, and elsewhere as required to provide access to equipment.
 - 3. Toilet exhaust system, where Landlord utility connection is provided 10 receive powered exhaust air from employee restrooms.
 - 4. Waste, water and vent system, where utility connections are provided by the Landlord for Tenant's utilization.
 - 5. Special or process exhaust systems provided by Tenant in their entirety, for criteria compliance, merchandising or process requirements.
 - 6. Thermal exhaust system (Food Court only), where provided by the Landlord for extension by the Tenant to remove internal heat gains.
 - 7. Kitchen exhaust system to comply with code requirements and provide heat, odor and particulate removal.
 - 8. Fire protection system where wet sprinkler system connection or standard grid and heads are provided for extension and/or relocation.
 - 9. Life safety interlocks, detectors required for occupied spaces to complete Landlord's system.
- D. Upgrades from quantities specified herein or other Landlord documents shall be subject to availability and approved at the sole discretion of the Landlord.
- E. No alterations shall be made to Landlord's system without prior approval of the Landlord. Relocations or other changes in these mechanical services will be by the Landlord's contractor, at Tenant expense.
- F. The Tenant shall submit written request for any deviations from, aid modifications to, the systems provided or specified for the -Tenant's mechanical system.
- G. The Landlord's standard mechanical criteria will be available for review by the Tenant and may be reproduced by the Tenant.
- H. All mechanical calculations, designs, drawings and specifications shall be prepared by or under the direct supervision of a Registered Professional Engineer licensed to practice mechanical engineering in the state of the proposed building site. The seal shall be affixed to each and every mechanical drawing.
- I. The mechanical design must provide systems meeting the most stringent of the following requirements:
 - 1. Minimums of this Mechanical Criteria for Tenant Finish.
 - 2. Landlord's life and casualty insurer.
 - 3. Governing building codes.
 - 4. OSHA.
 - 5. Laws, ordinances and regulations.
 - 6. Title 24 Certificate of Compliance.
- J. Provisions of this criteria shall apply to all mechanical systems, whether installed by the Mechanical Contractor or others (i.e., Kitchen Equipment Contractor, Division 2, 10, 11, 13, or 16 in association with mechanical systems).

MECHANICAL GENERAL REQUIREMENTS (cont'd.)

- K. The Landlord approval of design contract documents shall not release the Tenant from the responsibility to verify, adapt and develop installation drawings based on actual field conditions. Field directives, verbal or written, issued by the Landlord's on-site representative shall become part of, and modify previous Landlord approvals.
- L. The term "Tenant Space" or "Tenant Area" will generally mean a specifically designated area within the facility that is intended for lease by the Landlord to others. The term "common area" will be used to refer to all other areas on the property. Common area will include offices, electrical rooms, mechanical rooms, stairways, elevators, escalators, etc.
- M. The term "Mall" will generally refer to the finished un-leased space that is normally accessible to the public.
- N. Load calculations
 - 1. Mechanical system load calculations shall be prepared for the Tenant's space. These calculations shall indicate the requirements for all plumbing, fire protection and HVAC. HVAC calculations shall be as recommended in the ASHRAE handbooks and other ASHRAE publications.
 - 2. The load calculations shall be submitted to the LL for review and record purposes. These calculations shall provide sufficient detail to allow further analysis using various parameters, factors and areas. Load Calculation Summary form TSF-1 and TSF-2 attached to this manual shall be completed and included as part of the Tenant Contract Documents.
 - 3. Load calculations are required to determine terminal unit selection. Release of Terminal unit for installation, or upgrade of existing unit, will be withheld pending approval of a calculations.
 - 4. Outdoor Design Conditions from ASHRAE handbook

Summer:	HVAC design dry bulb	=1% design col.
	HVAC design wet bulb	= 1% design col.
Winter:	HVAC design dry bulb	= 99% design col.

- 5. Indoor Design Conditions

Tenant space shall be designed for temperature range indicated below and as described in the lease. Requests to deviate from the state parameters shall be subject to availability.

Summer:	20°F DB below outdoor design DB, but not lower than 75°F, nor higher than 78°F.
Winter:	70°F
- 6. Supply air temperature shall be as described in the lease.
- 7. Heat gain calculations shall be based on the time of peak gain (month, day and hour), considering coincident solar, thermal and internal environment heat gains. Heat gain calculations shall be based on full internal heat gains (all lights on) and full outside air requirements at design conditions.
- 8. Heat gains shall include full connected process loads and diversity factors used to determine peak load. Food court Tenant heat gains shall include the effect of the thermal exhaust system.
- 9. Heat loss calculations shall be based on full heat loss and full outside air requirements at design conditions. No credit shall be taken for internal heat gains.

MECHANICAL GENERAL REQUIREMENTS (cont'd.)

10. If complete space usage and requirements are not indicated, the following factors should be used to determine minimum heat gain.

Minimum Internal Heat Gains (based on gross area)

- a. Lights: Leasable areas 5.0 Watts/sf Avg.
- b. Power: Leasable areas 0.2 Watts/sf Avg.
- c. People: (based on total gross sf)
 - Normal retail 50 sf /Person Avg.
 - Common Retail 50 sf /Person Avg.
 - Medium density Areas 30 sf /Person Avg.
 - Food court Seating 20 sf /Person Avg.
 - Restaurant type Fac. 20 sf /Person Avg.
 - Theatre type Fac. 10 sf /Person Avg.
 - Lounge 10 sf /Person Avg.
- d. Process:
 - Kitchens-Full service restaurant or cafeteria
 - Power: (Food Prep Area) 40 Watt/sf avg.
 - Food court tenant
 - Power: GLA 40 Watt/sf avg.

O. Minimum exhaust Requirements

- 1. Minimum exhaust air requirements shall meet or exceed all the following requirements:
 - a. As required by governing or regulatory agencies and as recommended by ASHRAE
 - b. Toilet rooms and similar spaces such as locker rooms, shower rooms, service areas, mechanical areas, etc, shall have 2 CFM per sf or 50 FM, whichever is greater, minimum exhaust.

- c. Spaces with internally generated odors or other contaminants (such as beauty/barber shops, fabric shops, leather shops, pet shops, clothing stores, etc.) shall have approximately 4 FPM exhaust velocity through the cross section of the space.
 - d. Conference and meeting rooms shall have a minimum exhaust of 30 CFM per person
 - e. Mechanical rooms, electrical rooms, service areas, maintenance rooms, etc, shall have 12 air changes per hour minimum exhaust zone-sensor controlled.
 - f. Projection rooms shall be exhausted as required by the theatre owner or operator and the projector manufacturer. Projection room exhaust may be estimated as 750 CFM per auditorium as a minimum.
 - g. Kitchens shall be exhausted as required by applicable codes, the kitchen owner or operator, the kitchen equipment manufacturer and as required to remove the average internal heat gain.
 - h. Food court Tenants shall utilize LL supplied thermal exhaust system to remove the average internal heat gain (based on 10°F temp rise)
2. LL toilet exhaust stubs shall be utilized for employee restrooms only. Multiple fixture public restrooms requiring over 150 CFM, installations requiring constant fan operation, process, odor control or heat removal exhaust shall be routed independently to the building exterior as directed by the LL.

MECHANICAL GENERAL REQUIREMENTS (cont'd.)

- P. Air balance requirements
1. The total facility is to be maintained at a slight positive pressure by having the outdoor air supply exceed the exhaust by at least 10%. The air pressure difference between spaces internally shall generally be maintained neutral except for special cases. A 10-15% negative pressure relative to the adjacent spaces shall be maintained in the following areas:
 - a. Toilet rooms, locker rooms, service areas and similar spaces.
 - b. Spaces with internally generated odors or other contaminants (such as beauty/barber shops, fabric shops, leather shops, pet shops, clothing stores, etc)
 - c. Projection rooms
 - d. Food prep and serving areas
 2. Replacement air for exhaust systems will be provided by the Landlord's HVAC system. Separate makeup air units will not be allowed.
 3. Outdoor air will be provided through the Landlord's system.
 4. Tenant shall schedule balancing in advance with Landlord's onsite representative. Balancing contractor shall contact Landlord's on-site representative immediately upon arrival at site to determine status of system
 5. Adjustment of Landlord supplied system components shall be performed by or under the Landlord's direct supervision.
 6. Copies of balance reports shall be provided to Landlord for record purposes.
- Q. The Landlord's mechanical system design shall provide a minimum cooling capacity of 30 BTU/Sq.Ft. and air supply of 0.7 CFM/Sq.Ft. Terminal unit selection shall be based upon actual tenant requirements as supported by approved load calculations.
- R. Mechanical system design drawings shall be prepared for the Tenant's space. These drawings shall be complete showing all systems, equipment and details. Equipment layouts shall be accurate as to locations and provide generous access and clearances for maintenance and repair.

The mechanical drawings shall be to scale and show the intention for the completed installation and construction details. The mechanical system calculations and drawings shall be submitted to the Landlord for review and record purposes.

- S. Tenant shall maintain a copy of the most current mechanical installation drawings, equipment submittals and operation manuals on site.
- T. The Landlord's review of calculations, drawings and specifications is for general information only and determining Landlord supplied utility requirements. The Landlord's review is not intended to be for equipment application, etc.

Mechanical General Provisions

- A. Design all piping and ductwork to present a neat and orderly appearance. Run all lines parallel with building walls and construction. Keep piping and ductwork free from contact with structure or equipment to prevent noise transmission, allowing clearance for expansion and contraction.
- B. Locate all above floor piping, ductwork, equipment, etc., in the joist space where possible. Where use of the joist space is not practical, locate mechanical systems adjacent to the bottom of joists and beams maximum clear heights are to be maintained because of architectural, electrical and other mechanical considerations. Clear heights must be at maximum so that mezzanines and stacked storage can be accommodated.
- C. The design, materials, workmanship and all systems installations shall conform to the best current practice in the respective trades and shall be consistent with good engineering practice, manufacturer's recommendations, codes and various technical references, standards and guides. All workmanship and materials shall be of the highest quality in every respect and all materials and equipment shall be new and of the latest design and free of defects.
- D. Routing of HVAC, exhaust or plumbing systems requiring access through additional tenant spaces or the mall common area shall be coordinated with the Landlord's on-site representative prior to the start of construction.



MECHANICAL GENERAL REQUIREMENTS (cont'd.)

- E. Tenant's installation and systems shall not disturb interfere with the Landlord's equipment and systems. No tenant improvements shall be attached to, or suspended from the Landlord's mechanical system (i.e. ductwork, piping) for support in any manner.
- F. All piping and ductwork for public and office areas shall in general be concealed in walls and above ceilings. All pressure piping shall be above the floor and accessible.
- G. The mechanical contractor shall notify the Landlord's on-site representative and receive approval before starting any work. The Tenant's contractor shall execute all work so that it proceeds with a minimum of interference with other trades and normal functioning of existing facilities and services.
- H. All equipment shall be located so as to be the least visible by the public and from the streets. All outdoor mounted equipment shall be finish coated to blend with the background if adjacent to a wall or background, or be screened from vision if visible without a background. All equipment and systems located at or near grade shall be screened from vision and provided with security enclosures. All roof mounted equipment shall be symmetrically located and appear evenly distributed.
- I. Roof mounted equipment is to be designed for used with prefabricated full perimeter curbs or prefabricated roof equipment support. The mechanical contractor shall provide the curbs to the Landlord's designated contractor for selling and installation, All connections to units shall be inside the perimeter curb. No direct penetration of the roof will be allowed for condensate drains, refrigerant piping, control or power wiring. All equipment is to be supported from structural members. No weight shall be placed on the roofing materials or insulation or on metal roof decking.
- J. All curbs shall be insulated and extend a minimum of 8" above the high point of the roofing material.
- K. Roof curbs for equipment mounting shall be designed to structurally support the intended equipment and span the necessary building structural members. Additional support shall be provided for the roof decking under the equipment mounting curb.
- L. All units must be set level. Roof mounted equipment curbs must! Be provided with properly designed and fabricated leveling so the equipment is level and curb installation matches the roof slopes.
- M. All components and equipment shall be provided with access for ease of maintenance and service. Provide a minimum of 6'-0" clear around all sides of equipment or minimum prescribed by manufacturer for maintenance service and air circulation.
- N. All exhaust and plumbing vents must be a minimum of 20'-0" from any outdoor air intake.
- O. Condensate drainage from tenant HVAC or refrigeration units shall return to the Tenant's drainage system.
- P. All items projecting through roofs shall be flashed a minimum of 8" above the roof. HVAC units shall be provided with counter flashing.
- Q. Walkways shall be provided to protect roofing and aid in maintenance and service of the equipment. Walkways shall be provided around all roof mounted units that are specified to have filters and/or electric motors.
- R. The contractor shall not grant permission to the electrical contractor, telephone company or utility company to use the piping systems as a ground. The contractor shall be held responsible for damages that may be caused by such connection and shall replace the lines and repair all damages at no cost to the Landlord.
- S. Provide vibration isolation devices for all moving machinery. Provide flexible connections to all moving machinery.
- T. All power-using and heat exchange devices shall be provided with complete indicating instruments such as thermometers, gages, ammeters, etc.
- U. Provide access doors or panels for all valves, cleanouts, dampers, controls, devices, etc. This requirement applies to both tenant and Landlord systems within the tenant space. Minimum access size shall be 24" x 24". Panels shall be hinged or latched; nailed or screwed attachment is not acceptable. Knockout panels or removable ceilings or wall sections shall be provided for removal of equipment larger-than the 24" x 24" access size.

MECHANICAL GENERAL REQUIREMENTS (cont'd.)

- V. All access panels shall be provided with bakelite, adhesive 'or stenciled labels identifying the equipment, valves, etc, requiring access. Ceiling tiles utilized as access panels shall be labeled in a similar manner.
- W. All mechanical systems shall be finish coated and protected from weather or other adversities. Were possible, the finish shall be factory 'applied. The finish shall be coordinated to blend with the background. Colors must be approved by the Landlord's designated representative.
- X. All roof mounted devices shall be labeled with the Tenant's name and space number. Identification shall be stenciled on at least two sides of units with 2" high letters.
- Y. All materials, tools and equipment Shall be stored within the Tenant's own leased space. The Landlord assumes no responsibility for the security of materials, tools, equipment, etc.
- Z. The Tenant contractor shall hire the Landlord's designated contractor for all roof work.
- AA. All wiring for rooftop equipment shall be concealed within rooftop unit. If this cannot be accomplished, only rigid conduit will be allowed outside rooftop unit. Conduit shall penetrate roof similar to condensate drain detail.
- AB. The contractor shall obtain all required permits, approvals, certificates, etc., and shall provide all required tests, demonstrations, instructions, etc.
- AC. All existing conditions shall be field verified. Discrepancies shall be reported to the Landlord's on-site representative for resolution.

PLUMBING

- A. Provide complete plumbing system for the tenant space. The installation shall be complete with all fixtures, fittings, trim and accessories to provide a complete, functioning system. Comply with all code requirements and handicapped requirements (ADA).
- B. Toilet room minimum fixture requirements shall be determined by the number of occupants, space usage and governing codes.
- C. A waterproof membrane shall be installed in all wet areas such as restrooms and food preparation areas. The waterproof membrane must extend 4" vertically on all demising walls.
- D. Locate all above floor piping in the joist space where possible. Where use of the joist space is not practical, locate mechanical systems adjacent to the bottom of joists and beams. Maximum clear heights are to be maintained because of architectural, electrical and other mechanical considerations. Clear heights must be at a maximum so that mezzanines and stacked storage can be accommodated.
- E. Floor or deck penetrations are subject to review and approval for structural impact by Landlord prior to the start of construction.
- F. All Tenants shall provide floor drains in toilet and kitchen areas.
- G. Cleanout covers, floor drain strainers and access covers in finished floor shall have square tops.
- H. A minimum of one full line size cleanout shall be provided in each tenant space and as further required by code. Cleanout shall be floor or wall type accessible from within the Tenant's space.
- I. Provide code approved grease interceptors for all food preparation facilities. Grease interceptors shall be provided for pot sinks, triple sinks, dishwashers, etc- Interceptors installed within the lease space shall be above floor type.
- J. Beauty and pet shops or departments must have combination hair and solids interceptors.

K. Minimum sizes of piping and connections shall be:

Fixtures	CW	HW	Sanitary	Vent
P-1 Water Closet	1"	-	3"	2"
P-2 Urinal	3/4"	-	2"	1 1/2"
P-3 Lavatory	1/2"	1/2"	1 1/2"	1 1/2"
P-4 Wash sink	3/4"	3/4"	1 1/2"	1 1/2"
P-5 Service sink*	3/4"	3/4"	3"	2"
P-6 Laundry Tray*	1/2"	1/2"	1 1/2"	1 1/2"
P-7 Water Cooler	1/2"	-	1 1/2"	1 1/2"
Underground Piping	1"	-	4"	2"

* Provide hose connection with vacuum breaker.

- L. Water heaters shall be installed in 2" deep overflow pans. Pan and heater relief shall be piped to nearest drain. No instantaneous type hot water heaters are permitted; only storage type electric hot water heaters are allowed. Provide details for mounting and piping the hot water heater.
- M. PVC piping installation is not permitted.
- N. All domestic water piping shall be insulated, 1/2" (for cold) and 1" (for hot) nominal thickness, molded, sectional, polyfoam type or fiberglass insulation, all service jacket with self-sealing lap joint.
- O. Provide Landlord approved backflow preventor after domestic water point of connection and before the tenant space shut-off valve.
- P. Provide a water meter (read in cubic feet) after the valved connection to the point of Tenant's service.
- Q. All horizontal sanitary sewer lines installed above the ceiling of lower tenants, by upper tenants shall be insulated. Each Tenant shall provide a plugged "Y" branch fitting to provide for future connections.
- R. All restaurants, cafeteria and boutique tenants shall install a dedicated grease trap and indicate the exact location on the plumbing plan. Each Tenant is responsible for maintaining its system. Copies of maintenance and cleaning reports shall be submitted to Landlord.

PLUMBING (cont'd.)

S. Operating Charge for Water and Sewer

Method of Calculating the Operating Charge for Water and Sewer

1. Tenant shall provide Landlord with complete plumbing plans and specifications which shall show the quantities and capacities of all water consuming devices. Landlord's engineer shall estimate Tenant's water and sewer demand from this submittal.
2. Tenant's pro rata share of the water and sewer operating charge shall be computed by dividing the total square feet in tenant's premises by the total square feet contained in those premises which are leased, open and operating and which are not separately metered.
3. All establishments shall install a water meter (read in cubic feet) for determination of their water and sewer operation charge: The water and sewer operating charge shall be based-upon the rates LL is being charged by the applicable utility including taxes, assessments, charges, fees and surcharges.

Water Efficiency

1. The Tenant is required to install waterless urinals in tenant restrooms when urinals are used.
 2. Low-Flow water closets using 1.6 GPF or less gallons per flush will be installed in all tenant spaces.
 3. Operation sensors and low-flow heads using 0.5 GPM or less in lavatories.
- T. Tenant shall provide a main water shut off valve located at eye level in a wall behind a labelled access door. Locate in or near employee restroom as designed by Landlord.

Gas Piping System

- A. Gas service is generally available at designated locations. Utility access is limited to designated food service areas and available to others at the sole discretion of the LL and availability from the utility. All piping and associated work for extension of services to lease premises is by Tenant at Tenant's sole expense and is subject to LL's approval and governing code requirements. Any Tenant requiring gas service must contact Pacific Gas and Electric Company at the time of preliminary plan submittal to LL.
- B. Gas shall not be used for domestic water heater.

Seismic Gas Shutoff Valve

All new development and newly Tenanted restaurants need to have seismic gas shut-off valves installed on Landlord side of the meter, at each individual space. Seismic valves must be:

1. UL-approved;
2. FM-approved; or,
3. ACSE 25-compliant.

All devices must be installed consistent with manufacturer's instructions and following jurisdictional code.

All Tenants who use or have a gas line installed for their premises, or equipment that serves their premises, are required to install a code and Landlord-compliant seismic gas shut off valve on the main gas line serving the space.

PLUMBING (cont'd.)

Acid Waste Piping Systems

PIPE:

Flame Retardant BlueLine Schedule 40
Orion's BlueLine acid waste pipe will be manufactured to the dimensions and tolerances of ASTM F1412 from fire retardant material in 10' lengths. Pipe will be cylindrical and straight. Pipe will be supplied with factory grooves. The polypropylene material will conform to ASTM D4101.

FITTINGS:

Orion BlueLine acid waste fittings will be manufactured to schedule 40 dimensions per ASTM F1412 and will be made of fire retardant polypropylene. Fitting layouts will conform to ASTM D3311 and F1412. The polypropylene material will conform to ASTM D4101.

JOINING METHODS:

No Hub-Mechanical Joint

Pipe and fittings will be joined using the NO HUB method, utilizing all PLAIN END fittings joined with Orion's NO HUB Couplings. All couplings to have a chemical resistance equal to the pipe and fittings. Each NO HUB coupling will have an outer band of 300 series stainless steel with 5/16" bolts, nuts and washers plated to meet a 100 hour salt spray per ASTM B117. The NO HUB joint will conform to the requirements of ASTM F1412.

Rionfuse CF (Clamp Free) Electrofusion

The Orion Rionfuse CF System will utilize the SAME plan end fittings as the NO HUB system, but are to be joined using the Rionfuse CF couplings. The Rionfuse machine will be used to produce a hermetically sealed joint. The joints will conform to ASTM 1230, Technique I.

FIRE PROTECTION

The Landlord has developed a fire protection program to meet the City of Sacramento's requirements maintain favorable insurance rates for the Landlord and tenants and to maintain a high level of fire safety for employers and customers at Arden Fair Mall. The program includes the addition, revision to, or completion of various systems during tenant improvement. This work is the responsibility of the Tenant. The completion of the work as outlined in this document will assist the Tenant obtaining a Certificate of Occupancy from the City of Sacramento and minimize future costs for changes due to fire department and insurance company inspections.

For purposes of this Manual, the new building area is defined as the entire second floor and between column lines TT and AA on the first floor. The existing building area is between column lines Band N (see Plans).

The Tenant is responsible for incorporating the following criteria in their construction.

A. Construction Requirements

1. All tenant improvements must meet the current code requirements as adopted by the City of Sacramento.
2. The Tenant shall submit to the City of Sacramento complete plans including all tenant fire protection improvements and existing conditions that are proposed to remain.
3. The Tenant shall pay all plan check fees, permit fees, inspection fees or other fees as required by the City of Sacramento.
4. All tenant improvements shall meet the requirements of a Type J1-N Building as defined by the Uniform Building Code.
5. Tenant walls shall be as follows:
 - a. Walls providing separation between a corridor, exit passageway or stair enclosure shall be of one-hour fire resistive construction. In new building areas, the Tenant is responsible for properly installing 5/8" Type X drywall on the tenant side of the stud wall separating the Tenant from the corridor or exit passageway. In existing building areas, the Tenant is responsible for any patching work to maintain the existing walls integrity.

- b. Demising partitions shall be constructed of one hour fire resistive materials. Dry wall to terminate 1'-0" below underside of deck.
 - c. Walls within tenant spaces shall be of noncombustible materials unless a higher level of protection is required by the building code due to occupancy.
6. In new areas, combustible material is not permitted above the ceiling. In the existing building areas, existing combustible construction must be removed and be brought to required UBC code.
7. In the existing building areas, some tenants have direct access to a basement area. Upon tenant improvement, the Tenant is responsible for upgrading these basement areas to current code requirements. If the basement area exceeds 300 square feet, A second means of egress from the basement is required.

B. Automatic Sprinkler

1. All work on automatic sprinkler systems must be performed by Landlord approved contractor holding a valid C-16 license (Fire Protection) within the State of California, at Tenant's expense.
2. In new building areas, the Landlord has installed in each tenant space a preliminary sprinkler system with one sprinkler installed to cover approximately 100 square feet. This system is hydraulically calculated to permit up to 20% additional automatic sprinklers on all branch lines. The contractor may install up to two sprinklers from an existing single sprinkler branch line outlet without preparing additional hydraulic calculations and limiting the total number of additional sprinklers to the 20% limit. New hydraulic calculations will be necessary if the contractor exceeds the 20% limit or relocates, revises, or changes the existing branch line layout (grid system).
3. In new existing building areas, a pipe schedule system is installed. Contractor shall revise all existing piping and install all new piping to conform to the pipe schedule requirements of NFPA 13.
4. For all tenant spaces, the tenant contractor shall prepare shop drawings and submit them to Landlord for approval before construction begins. Two sets of reproducible copies of the completed tenant

FIRE PROTECTION (cont'd.)

sprinkler shop drawing shall be submitted to Landlord for review before fabrication and installation. Additional drawings shall also be provided as required by the City of Sacramento. Shop drawings shall include the following information at a minimum:

- a. All information required by Section 1-9, NFPA 13, 1987 edition.
 - b. Complete layout of the existing automatic sprinkler system within the tenant space including pipe sizes, hangers with detail of earthquake bracing, etc.
5. In the existing building areas, the contractor shall provide the following additional work:
- a. Install new earthquake bracing on all existing cross main and feed main piping within the tenant space. Earthquake bracing shall be installed at a maximum distance of 20'-0" from a demising partition and at a maximum spacing of 40'-0" within the tenant space. Should conforming earthquake bracing exist within a Tenant space, contractor shall provide sufficient evidence to Heitman Retail Properties and the City of Sacramento in lieu of installing new earthquake bracing.
 - b. Replace any non-standard hangers on existing pipe.
 - c. Re-pipe all existing sprinklers as necessary to meet NFPA 13 pipe schedule requirement.
 - d. Provide additional sprinklers or relocate existing sprinklers so that the entire space meets NFPA 13 requirements.
6. Maximum sprinkler spacing shall be as follows:
- Sales area: 130sf
Stock area: 100sf
7. Sprinkler temperature ratings should be noted on drawings and shall be as follows:
- 165 °: Sales area.
212 °: display windows, electrical rooms, and water beater rooms.
286 °: Stock and storage rooms exceeding 500 square feet.

8. Design densities for hydraulically calculated areas shall be as follows:
- Sales area: NFPA 13, Ordinary Hazard Group 2.
Stock areas: NFPA 13, Ordinary Hazard Group 3 (storage under 12'-0").
Stock Areas: NFPA 231/231c (storage over 12'-0").
9. Decorative wood beams, bung lighting changes in ceiling height or other obstructions to potential sprinkler discharge shall have sprinklers spaced as if the obstructions were a full height wall or in accordance with Table 4.2 4.6, NFPA 13, 1981 edition.
10. Tenant sprinkler systems shall give: coverage up to the tenant lease line. The mall sprinklers shall not be used as partial coverage over the tenant lease line.
11. There shall be at least 18" clearance between ceiling sprinklers and stock, storage, merchandise or displays.
12. Dry pendent sprinklers shall be installed in all walk-in coolers.
13. Suspended luminous ceilings must meet the following criteria if, any:
- a. Be completely covered over the top of the lighting recess and separated from the plenum area above the ceiling with 5/8" resistant gypsum board.
 - b. Sprinklers rated 212° shall be installed above tile luminous ceiling (below the gypsum ceiling) if the space between the luminous ceiling and dry wall ceiling exceeds 12". Sprinkler spacing shall not exceed 100 square feet per sprinkler.
 - c. Complete sprinkler coverage shall be installed below the luminous ceiling. Sprinklers above the luminous ceiling shall not be considered to protect the area below the luminous ceiling. If sprinklers are installed above and below a luminous ceiling the sprinkler below the ceiling shall have a shield to prevent water spray from a sprinkler above.
14. Drop out ceiling panels are not permitted in lieu of automatic sprinklers below the ceiling.

FIRE PROTECTION (cont'd.)

C. Other Requirements

Pipe:	Sprinkler pipe used shall be black steel and must comply with ASTM specification A53, A135, or A795. Dimensions for all pipe must be in accordance with the American Standard for Wrought Steel and Wrought Iron Pipe ANSI No. B-36, 10-70 for pressure up to 300 PSI. Schedule 40 pipe is considered "standard wall pipe".
Fillings:	Changes of direction shall be accomplished in the use of fillings suitable for use in sprinkler systems as defined in Section 3-12 NFPA 13. Bushings shall not be used.
Hangers:	All hanger components shall be of the listed and approved type.
Note:	Tenant's sprinkler contractor shall report to Landlord's on-site representative to request draining and filling of sprinkler systems. The associated Tenant cost is a one time non-refundable charge of \$500.00

D. Fire Alarm

1. The Landlord has provided a system of smoke detectors complete with all wiring to the mall fire alarm panel. Smoke detectors are located on the ceiling at the inside front of each Tenant space (Simplex 2098-9544 Smoke Detector Head; Ionization Detector, Simplex 2098-9652 Smoke Detector Base; Addressable base with LED).
2. In newly constructed spaces, Landlord will drop this smoke detector below the Tenant's finished ceiling at the Tenant's entrance to the mall. Smoke detector shall be located on the Tenant's side of the lease line. Coordinate this smoke detector drop with Landlord's onsite representative.
3. For restaurants with dry-chemical systems protecting cooking equipment, the Tenant shall interlock this system for supervision with the Mall fire alarm system. Tenant shall provide and install all wiring, metallic conduit, and Simplex monitor module necessary for an operational system. Connection shall be within an appropriate existing fire alarm junction box within the tenant space.

4. For pre-existing mall tenants (lower level between column lines B – N), Landlord has installed and dropped smoke detectors to Tenant's finished ceiling per fire protection requirements. Relocation or tampering with such smoke detectors is prohibited by law.

E. HVAC System

The common Tenant HVAC system includes duct smoke detectors and smoke dampers. This equipment is generally located in second floor tenant areas. Tenant shall maintain access to this equipment through lay-in tile ceilings or access panels (second floor only).

F. Fire Extinguisher Requirements

Tenant shall furnish and install fire extinguishers throughout its leased premises. During construction and normal operations, one extinguisher is required for every 3,000 square feet of space, with a maximum separation of 75'-0" walking distance. The type of extinguisher shall be Class 4-A:10B:C dry chemical. Locations must be approved by local code authorities before installation. Fire extinguishers are also required during construction.

HVAC

Air Distribution

- A. Provide a complete, air distribution system for the space HVAC requirements. Provide all required components such as duct systems, diffusers, registers, dampers, etc.
- B. All air systems shall be low pressure as defined in the ASHRAE Guide. All main trunks and main branches shall be galvanized sheet metal. All supply, return and outdoor air ducts shall, be insulated (provide all insulation specifications with drawing submittals) for thermal and acoustic purposes. All duct systems shall be designed, constructed and installed as recommended by ASHRAE and SMACNA.
- C. Heating requirements shall be provided by a source independent of the operation of the Landlord's central air system (i.e. fan powered box, unit heater, cabinet heater, baseboard). No inline duct coils are acceptable.
- D. Tenant ductwork shall be designed and installed to be within the design limitations set forth in the lease for downstream static pressure.
- E. The Tenant's air distribution system shall provide adequate air motion to all portions of the demised space. All conditioned areas shall have even temperature distribution without excessive air motion.
- F. All duct work shall be shop fabricated. All systems shall be designed and components selected such that duct work external to the building will not be required.
- G. All air distribution devices and systems shall be selected for a noise criteria level of NC 35 maximum. Neck velocities shall not exceed 800 FPM.
- H. All diffusers, grilles, registers, etc. shall be protected to maintain the railing of the construction in which they are installed.
- I. Flexible duct may be used only for low pressure runouts to individual diffusers. A flexible duct runout shall not exceed 5'-0".
- J. Tenant's ceiling cavity will generally be utilized as a return air plenum.
- K. Supply air shall be distributed from lowest ceiling elevation.
- L. Return air registers shall be located at the highest ceiling elevation to eliminate heat build up.
- M. Contractor shall add or modify existing return air openings in the space demising walls to provide adequate free area. Contact Landlord's onsite representative for exact requirements.
- N. Provide manual volume dampers at all branch take-offs and duct tees.
- O. Spaces without ceilings, where allowed, will require a transfer duct between the adjacent spate demising wall return air openings. Duct shall have an equivalent free area to the openings. Landlord return or relief cuts located within the space shall be extended full size and connected to the transfer duct. Return air register shall be provided in transfer duct for space without ceiling.
- P. Food Court tenants shall provide thermal exhaust registers for heat removal. Registers shall be sited for 3000 CFM at no greater than 400 FPM and should be located adjacent to, major heat producing equipment. Duct registers to the Landlord supplied exhaust stub if the ceiling cavity is not sealed airtight.
- Q. Locate all above floor ductwork, equipment, etc., in the joist space where possible. Where use of the joist space is not practical, locate mechanical systems adjacent to the bottom of joists and beams. Maximum clear heights are to be maintained because of architectural, electrical and other mechanical considerations. Clear heights must be at maximum so that mezzanines and double stacked storage can be accommodated.
- R. Roof mounted equipment and components are to be designed with low silhouettes and clean lines and located where least visible. Roof mounted equipment and components shall be refinished in a color to blend with background or as directed by the Landlord's on-site representative.
- S. Air diffusers, registers, and shall be designed to coordinate with the general construction and architectural treatment of the finished spaces. Exposed components shall be given a factory-baked enamel or anodized finish. Air diffusers and grilles shall be mounted in frames so the devices may be easily removed for maintenance and repair.
- T. All supply diffusers and registers shall have fully adjustable air patterns. Ceiling diffusers shall be louvered face round neck type, with balancing damper in branch runout. Linear or slot diffusers with full pattern adjustment and insulated boots may be substituted.

HVAC (cont'd.)

- U. Return air registers shall be sized for 400 PPM maximum. A minimum of 4 square feet of register shall be provided per tenant space.
- V. Ceiling exhaust fans shall be direct driven centrifugal with insulated metal housing, back draft damper, internal isolators, and wall or roof cap complete with bird and insect screen, Maximum noise level rating of the unit shall be 6 sones. Interlock toilet exhaust fans with the room light switch.
- W. Duct work shall be sized for a maximum friction of 0.10 inches of water column per 100'-0" of duct at design air flow. Duct velocity shall not exceed 2000 PPM for main trunks and 1500 PPM for branches.
- X. Minimum outdoor air will be provided through the LL system.
- Y. Replacement air shall be provided through minimum setpoints of terminal units and transfer from the mall. No separate make-up air units are acceptable. No direct ducted connection of LL supplied terminal units to make-up air plenum of a compensating hood will be allowed.
- Z. Tenant Shall Provide at Tenants Expense a Trane Single Zone VAV Box Model VCCF, ENVIRO-TEC[®] Model SDR Single Duct Variable Air Volume Terminal Unit or landlord approved equivalent.
- AA. Tenant space heating shall be accomplished with Tenant supplied and installed duct heating equipment approved by Landlord.

Operating Charge For Air Conditioning

- A. General

The operating charge provides for and is limited to air conditioning and ventilation. The operating charge, when established in accordance with this Manual, shall become part of the additional rental.

Tenant will be charged for such services, as outlined in the lease agreement, its pro rata share as calculated in accordance with the terms of this Exhibit, as hereinafter provided.
- B. Method of Calculating the Operating Charge
 1. As part of Tenant's plan submittal, Tenant shall provide to Landlord a complete description of all electrical and gas consuming devices, showing the quantities and capacities of such equipment.

2. Landlord's engineer will calculate the pro rata share of the operating charge based on quantities and capacities of all electrical and gas consuming devices for each Tenant. The calculations will be based upon 320 hours of operation of Tenant's leased premises per month. The base cooling load of 35 BTUH per square foot shall then be multiplied by Tenant's leased square footage. This product will be used as the numerator of a fraction for determining Tenant's pro rata share of operating costs. This number shall be adjusted as provided hereinafter.

C. Adjustments to Operating Charge

1. The operating charge when related to the design load of 35 BTUH per square foot of the leased premises will be increased or decreased if Landlord's engineer finds that the calculated cooling load is greater or less than 35 BTUH per square foot or the monthly operation of equipment exceeds 320 hours per month (no decrease will be considered for hours of operation), and will be calculated as follows:

Calculated			
Cooling	Actual		
Load X	Hours X	Total BTUs=	Adjusted Cooling Load
35 BTUH	320 hours	(From B above)	

This will be Tenant's adjusted numerator for determining its pro rata share of the total operating charge.

Pro rata share for the purpose of the operating charge is defined as that part of any cost allocable under the terms and provisions of this lease to any party. The pro rata share shall be computed by multiplying such costs by a fraction, the numerator of which shall be determined by the provisions of this Exhibit of the party whose pro, rata share is to be determined and the denominator for which shall be the total of all numerators for spaces producing rent in the Mall.

2. Prior to Tenant adding or removing equipment or otherwise modifying its space to either increase or decrease usage of air conditioning or ventilation in Tenant's space, tenant shall notify LL of the change in writing and shall provide LL's engineer with a detailed description of the change. LL's engineer shall then recalculate the operating charge as described above.

HVAC (cont'd.)

The new charge shall become effective as of the date modifications are made. LL, at LL's option, may choose to check tenant's consumption of air conditioning and ventilation from time to time and adjust accordingly.

3. Tenant shall have the option to question the adjusted cooling load calculation by employing Landlord's engineer at Tenant's expense to seek a reasonable justification of the adjusted cooling load calculation. Landlord's decision shall prevail.
4. Makeup air for exhaust systems from kitchen, food preparation area, dining area, and cafeteria area must be accomplished by tenant-furnished and installed makeup air systems or, at Landlord's discretion, from secondary Mall air. If more than 10% of the air furnished to Tenant from Landlord's air supply system is used as supply air for Tenant's special exhaust system, the operating charge as decreed in this Exhibit will be adjusted as follows:

$$1 + \frac{\text{CFM for Tenant's exhaust}}{\text{total supply CFM}} - .1 \times \text{Operating Charge}$$

Power Roof Ventilators

A. Power Roof Exhausters

1. Provide power roof exhausters of the low silhouette design in size and type as required. Units shall be complete with belt or direct driven centrifugal blower motor and drive, aluminum or fiberglass housing automatic back draft dampers with spring return, prefabricated unit mounting curb, internal fused disconnect switch, switch, bird and insect screens, internal isolators and mounting base to match the installed curb.
2. Exhaust fan discharge dampers shall be parallel blade, neoprene lined edge reasonably air tight when closed, located close to outdoor outlet with damper control operator to keep same closed when fan is off and open as required when fan is on.
3. Exhaust discharge outlets relief air outlets and rooftop equipment shall be mushroom type with roof locations and projections above roof approved by Landlord and to comply with governing codes.

Projections above 3'-0" require special approval. All roof mounted equipment shall be approved by Landlord and installed on curbs at least 1'-0" high, properly flashed into the roof by Landlord roofing contractor.

4. Select each unit for a maximum of 4000 FPM tip speed. Power roof exhauster shall be rated in accordance with ANCA standards. Maximum noise level rating of the unit shall be 12 sones.
5. Furnish the necessary curbs, starters, switches, interlocks. And control devices. Units shall be as manufactured by:

Acme Eng. & Manuf.	Series PL or PRL
Jenn-Air Corp.	Series ICBS
ILG Industries Inc.	Series L-CBF or S-CBF
Penn Ventilator Co.	Series LC

B. Kitchen Exhausters

1. Roof mounted kitchen exhaust units shall be similar to power roof exhausters described above except exhaust shall be vertical up-blast, motor shall be out of the air stream and a full perimeter grease trough shall be provided.
2. Installation shall be hinged at 11th mounting base with flexible electrical connections for easy access to blower wheel and internal components. Units shall be as manufactured by:

Acme Eng. & Manuf.	Series PL or PRL
ILG Industries	Series L-CBF or S-CBF
Jenn-Air Corp.	Series ICBS
Penn Ventilator Co.	Series LC

3. Provide an approved grease accumulation receiver for the kitchen exhauster installation: Tenant must service and maintain grease accumulation receiver.

C. Kitchen Exhaust Systems

1. Provide kitchen exhaust systems of sizes and types as required. Each system shall be complete with hood, grease filters, grease

HVAC (cont'd.)

- trough, grease collectors, dry type fire protection system, kitchen exhaust unit, etc.
2. Kitchen exhaust systems shall be as required by Factory Mutual, NFPA, national and local authorities. Fire protection system shall provide auxiliary normally open and closed alarm contacts for connection to Landlord's fire alarm system. Tenant shall extend wiring from contracts to termination point designated by Landlord.
 3. The Tenant shall be responsible for ascertaining and complying with all environmental standards.
 4. Supplemental air treatment systems required to remove objectional odors and smoke as determined by local codes and regulations and the Landlord, shall be provided by the Tenant at the Tenant's expense.
 5. Cooking exhaust hoods shall be a minimum of 16 gage stainless type 304 steel with all seams welded and ground to a No. 3 polish. Hood shall be complete with filter racks, grease gutters, grease collectors, fire protection system and completely accessible.
 6. Grease filters shall have stainless steel media and frame and two bandies per filter.
 7. Cartridge filter or water wash hoods may be utilized or required in some applications.
 8. Exposed ductwork shall be enclosed with stainless steel, finished to match hood.
 9. Kitchen exhaust ductwork shall be all black iron constructed with continuous external welding or brazing. Duct system shall be suitably protected against corrosion.
 10. Kitchen exhaust ductwork shall be installed so that grease cannot accumulate in any portion. Ductwork shall pitch not less than 1 inch per foot toward the hood or other grease reservoir. Air velocity through the duct system shall be at least 1500 FPM
 11. Kitchen exhaust duct shall terminate outside the building in a manner that disperses effluents to avoid contamination of outside air intakes prevents down drafting or pocketing in low points, etc.
 12. No duct system shall have openings other than those required for proper operation and maintenance of the system. Any portion of such system having sections inaccessible from the duct entry or discharge shall be provided with adequate cleanout openings. All cleanout openings shall be of sufficient size and located so as to permit a thorough cleaning of the entire system. Cleanout openings shall be equipped with tight fitting doors constructed of metal which is equal to or greater in thickness than the ducts and such doors shall be equipped with a substantial method of latching sufficient to hold the door tightly closed. These doors shall be so designed that they can be opened easily without the use of a tool.
 13. Ducts penetrating a wall or floor shall be enclosed from the point of penetration to the outside air. The shaft or enclosure shall be separated from the duct by a minimum of three inches (3") and a maximum of 22 inches and this area shall be ventilated to the outside air. Such enclosures shall be sealed at the point of penetration.
 14. If cleanout openings are located in ducts within a fire resistive shaft or enclosure access openings shall be provided in the shaft or enclosure at each cleanout point. These access openings shall be equipped with tight-filling sliding or hinged doors, equal in fire-resistive construction to that of the shaft or enclosure.
 15. Every duct system shall have a clearance from combustible construction of not less than 18 inches. This clearance may be reduced to not less than 3" provided the combustible material is protected with materials as approved for one-hour fire-resistive construction on the duct side.
 16. Kitchen exhaust ductwork shall be insulated with a high temperature material, such as:
 - Owens-Corning "Kaylo" Calcium Silicate
 - John-Manville "Cera Blanket"
 - Minimum of 2" thickness
 17. Water wash hood drains shall be routed through code approved grease interceptors.

HVAC (cont'd.)

18. Food preparation exhaust systems shall have automatic extinguishing equipment should be installed in accordance with the National Fire Protection Association Standard 96, latest edition, Section 10.

The extinguishing system shall be Underwriters' Laboratories approved CO₂ or dry chemical pre-engineered system with the following features:

- a. Protection of the hood and duct.
- b. Surface protection for deep fat fryer, griddle, broiler and range.
- c. Automatic devices for shutting down fuel or power supply to the appliances getting the surface protection, must be manual reset.

Variable Volume Terminal Box Specification

Terminals shall be certified by ARI and bear the ARI 880 seal.

CONSTRUCTION

Terminals shall be constructed of not less than 22 gauge galvanized steel, able to withstand a 125 hour salt spray test per ASTM B-117. Stainless steel casings, or galvanized steel casings with a baked enamel paint finish, may be used as an alternative. The terminal casing shall be mechanically assembled (spot-welded casings are not acceptable).

Casing shall be internally lined with 1/2" thick fiberglass insulation, rated for a maximum air velocity of 5000 f.p.m. Maximum thermal conductivity shall be .24 (BTU • in) / (hr • ft² • °F). Insulation must meet all requirements of ASTM C1071 (including C665), UL 181 for erosion, and carry a 25/50 rating for flame spread/smoke developed per ASTM E-84, UL 723 and NFPA 90A. Raw insulation edges on the discharge of the unit must be covered with metal liner to eliminate flaking of insulation during field duct connections. Simple "buttering" of raw edges with an approved seal-

ant is not acceptable. All appurtenances including control assemblies, control enclosures, hot water heating coils, and electric heating coils shall not extend beyond the top and bottom of the unit casing. At an inlet velocity of 2000 f.p.m., the static pressure drop across the basic terminal or basic terminal with a sound attenuator shall not exceed .08" W.G. for all unit sizes.

PRIMARY AIR VALVE

The primary air valve shall consist of a minimum 22 gauge cylindrical body that includes embossment rings for rigidity. The damper blade shall be connected to a solid shaft by means of an integral molded sleeve which does not require screw or bolt fasteners. The shaft shall be manufactured of a low thermal conducting composite material, and include a molded damper position indicator visible from the exterior of the unit. The damper shall pivot in self lubricating bearings. The damper actuator shall be mounted on the exterior of the terminal for ease of service. The valve assembly shall include internal mechanical stops for both full open and closed positions. The damper blade seal shall be secured without use of adhesives. The air valve leakage shall not exceed 1% of maximum inlet rated airflow at 3" W.G. inlet pressure.

PRIMARY AIRFLOW SENSOR

For inlet diameters 4" or greater, the differential pressure airflow sensor shall traverse the duct along two perpendicular diameters. Cylindrically shaped inlets shall utilize the equal cross sectional area or log-linear traverse method. Single axis sensor shall not be acceptable for duct diameters 4" or larger. A minimum of 12 total pressure sensing points shall be utilized. The total pressure inputs shall be averaged using a pressure chamber located at the center of the sensor. A sensor that delivers the differential pressure signal from one end of the sensor is not acceptable. The sensor shall output an amplified differential pressure signal that is at least 2.5 times the equivalent velocity pressure signal obtained from a conventional pitot tube. The sensor shall develop a differential pressure of 0.03" w.g. at an air velocity of < 450 FPM. Documentation shall be submitted which substantiates this requirement.

HVAC (cont'd.)

ACTUATOR

Provide 3-wire floating point modulating control valve (fail-in-place) or 0(2)-10vdc control actuator in lieu of standard 2-position control valve ON-OFF type. The 2-position ON-OFF Control Actuators are **NOT** acceptable.

Controls and Instrumentation

All terminal VAV units must be equipped with a **DDC** (DIRECT Digital Controller) SUCH as a JOHNSON CONTROLS FX-PCV1615/1626/1628/1630 Programmable VAV Box or landlord approved equivalent. Control VAV must be BACNET/MSTP compatible. The microprocessor based terminal unit controller provides accurate, pressure-independent control through the use of a proportional integral control algorithm and direct digital control technology. The DDC monitors zone temperature set points, zone temperature and its rate of change, and valve airflow using a differential pressure signal from the pressure transducer.

The DDC controller senses zone temperature through a sensing element located in the zone sensor. In addition to the sensing element, zone sensor options may include an externally-adjustable setpoint. Standard ON-OFF

ELECTRICAL

Thermostat NOT ACCEPTABLE.

PRESSURE DEPENDANT VAV CONTROL NOT ACCEPTABLE.

Replace all references for Thermostats to zone sensors. Remove notes for thermostats such as discussions regarding anticipators or mercury bulbs.

General Provisions

A. Electrical Service

1. Power Characteristics

VoHiige277/480, 3 Phase, 4 Wire

2. Service Conduit

The Landlord will finish and install at Tenant's expense an empty conduit to each tenant space from Landlord's fusible switchboard.

3. Service Conductors

The Tenant shall furnish and install feeder conductors in empty conduit provided by Landlord.

4. Service Connections

The connections of tenant feeder conductors to the Landlord's switchboard shall be performed and/or supervised by the Landlord's General Contractor's electrical subcontractor at Tenant's expense. The Tenant shall arrange with the Sacramento Municipal Utilities District (SMUD) for new service.

Tenant shall contact Landlord's General Contractor and/or electrical subcontractor for access to Landlord's switchboard.

B. Codes and Specifications

The entire electrical installation shall conform to the latest editions of the National Electric Code and all local codes that govern as well as to title "O" Tenant specification.

Basic Materials and Methods

A. General

1. Approved Equipment

All electrical equipment shall be new, shall be National Electric Code (NEC) standard, unless a better grade is required for local code and must bear the Underwriter's Laboratories label.

2. Branch Circuitry

a. All branch circuitry shall be installed in galvanized EMT using #12 AWG minimum copper wire with type TW, THW or THHN-THWN insulation.

b. The minimum conduit size shall be 3/4".

c. Type MC cable may be used consisting of a Corrugated seamless aluminum tube enclosing one or more THHN conductors equal to Coleman Cable Systems, Inc. Corra/Clad". Installation must comply with NEC 334.

d. No nonmetallic conduit shall be used for branch circuit work above grade.

e. Any exposed low voltage wiring must be plenum graded.

6. At grade level electrical conduit may be installed at least 4" under the slab and must be in Schedule 40 PVC conduit. But never allowed to be installed in the slab or less than 4" below slab.

3. Lighting Fixture Connections

a. Flexible conduit (Greenfield) tails, 6'-0" in length maximum, may be used between recessed accessible fixture outlet box and recessed fluorescent lighting fixtures. Outlet boxes of this type may serve up to four separately recessed fluorescent fixtures.

4. Tenant's Design Drawings

a. A complete electrical drawing set shall be prepared, submitted to Landlord and approved by Landlord before installation of tenant work begins.

b. Tenant's electrical drawings shall include a complete lighting fixture schedule with lamp types indicated, complete panel schedules including manufacturer's catalog numbers, and all

ELECTRICAL (cont'd.)

switch, circuit breaker, and fuse information, a complete heating, ventilating, air conditioning control wiring diagram. A one-line diagram similar to that appended to this specification, indicating wire, conduit, transformer, circuit breaker, switch and fuse sizes and types shall be included.

- c. Include the following list of electrical data in the form indicated below and located in the lower right-hand corner of the drawing.

Item	Voltage	Connected	Demand	Notes
		KVA	KVA	
Lighting				
Receptacles				
Air Handlers				
A/C Units				
Electric Space Heaters				
Electric Water Heaters				
Miscellaneous Other Loads				
Total Connected Load				
Design Demand Load				
Estimated Billing Demand Load - Summer				
Estimated Billing Demand Load - Winter				
Time of Day Maximum Demand is Anticipated - Summer				
Time of Day Maximum Demand is Anticipated - Winter				
Store Business Hours				
Additional Store Hours for Cleaning, Stocking, etc.		AM		
		PM		

B. Raceways

Feeder conduit installed indoors may be galvanized EMT, rigid aluminum, or heavy wall galvanized rigid steel. Feeder conduit installed outdoors maybe heavy wall, galvanized, rigid steel or rigid aluminum (if not in contact with earth, concrete or mortar).

C. Wire and Cable

- 1. Feeders

Feeder cable shall-be copper. Insulation to be THW or THHN THWN. No aluminum wire installation is permitted.

2. Color Code

All wiring shall be color coded throughout as follows:

120/208 volt system	277/480 volt system
phase A - Black	phase A-Brown
phase B - Red	phase B - Orange
phase C - Blue	phase C - Yellow
Neutral - White	Neutral - White with tracer or grey

Color code shall identify the same phase throughout the system from service switch or transformer through all branch circuitry.

D. Disconnect Switches

- 1. Disconnect switches shall be General Duty, in appropriate Nema enclosures.
- 2. A line voltage, horsepower rated, disconnect switch shall be installed adjacent each motor.

Service and Distribution

A. General

1. Design Conditions

- a. Landlord has sized, electrical service sufficient to accommodate a nominal electrical installation of 10 watts per square foot for retail tenants, 65 walls per square foot for Food Court tenants and 42 walls per square foot for restaurants and cafeterias. Loads in excess will require special review and written permission of Landlord, and Tenant shall be charged for required revisions to Landlord's distribution system.
- b. A conduit sized to accept copper conductors of an ampacity based upon the above load at 3 phase, 4 wire, 277/480 volts, has been furnished to the tenant space, as well as switch and fuse protection. Tenant's electrician shall install fuses properly

ELECTRICAL (cont'd.)

coordinated to serve this load.

- c. Tenant electrical designer shall be responsible for sizing all electrical equipment ampacities and protection.

2. Increased Loads

If the particular design load for this space is greater than that indicated above, the design engineer for the Tenant must coordinate with Landlord regarding increased loading and the calculations for "service switch" fuse protection and service conduit and wire. The cost of the larger service and of any other electrical work necessary to accommodate the larger load shall be borne by the Tenant.

B. Transformers

1. Insulation Class

Transformers shall have Class 11 insulation, with multiple taps above the rated voltage.

2. Demand Load

Transformer demand load shall not be greater than 80% of the transformer rating.

3. Phase Connections

Single phase transformers shall not be used without permission from Landlord.

4. Ground

Transformer neutrals shall be securely grounded to the building steel.

C. Distribution Panels

1. Panel Type

Distribution panel may be of the switch and fuse or circuit breaker type.

2. Trough Distribution

If distribution is made from a trough to several fused switches and/or panels, separate taps shall be made from the feeder to each load.

Parallel feeders shall be spliced together adjacent to each tap.

No tap shall be made that does not terminate in fuse or circuit breaker protection immediately adjacent to the trough, with the exception of a tap suitably protected by the "service fuse".

3. Load Balance

The connected loads shall be balanced so that a variation of amperage of less than 10% is present between the phases.

D. Lighting and Receptacle Panels

1. 120/240 volt and 120/208 Volt Panels

120/240 volt and 120/208 volt lighting and/or receptacle panels shall have bolt-on type circuit breakers and must have main circuit breaker or fuse protection.

Panel bus shall be suited to its protection as well as adequate for the design load plus a minimum of 15% spare.

2. 271/480 Volt Panels

271/480 volt panels shall have bolt-on circuit breakers.

Panel bus shall be suited to its protection as well as adequate for the design load plus a minimum of 15% spare.

3. Multiple Circuit Breakers

Multiple loads shall be protected by multiple circuit breakers having common trip and single handle. Handle ties and trough clips or pins are unacceptable:

4. The city requires that panels be located behind a door or enclosed in a cabinet, in order to prohibit stacking against panel/transformer. Work area must be 42" in front of panel with 30" sideways. This applies for panels located in a stockroom area only.

Lighting

A. General

Incandescent, quartz halogen or other lamps producing 45 lumens per watt or less shall be used only for decorative, accent or special display lighting, or in particular cases where incandescent "color" is mandatory.

ELECTRICAL (cont'd.)

In all other cases, illumination shall be mercury vapor, fluorescent, multi-vapor or high pressure sodium.

B. Ballasts

Lighting fixture ballasts shall be high power factor CBM labeled.

C. Lighting Fixtures

Lighting fixtures shall be Underwriters Label and be of a type approved by City inspection authorities. Recessed fixtures installed in furred spaces shall be connected by means of flexible conduit and "AF" wire run to a branch circuit outlet box which is independent of the fixture. Fluorescent ballast shall have individual non-reselling overload protection.

D. Storefront and Signage Lighting

All storefront and signage lighting is to be on the time clock circuit.

Special Systems

A. Telephone

1. Each tenant shall, be responsible for obtaining phone service from the local telephone utility company. The Tenant shall provide a complete conduit with pull wires installed for the utility company.
2. The LL has provided telephone distribution points within the project from which each tenant must have service provided.

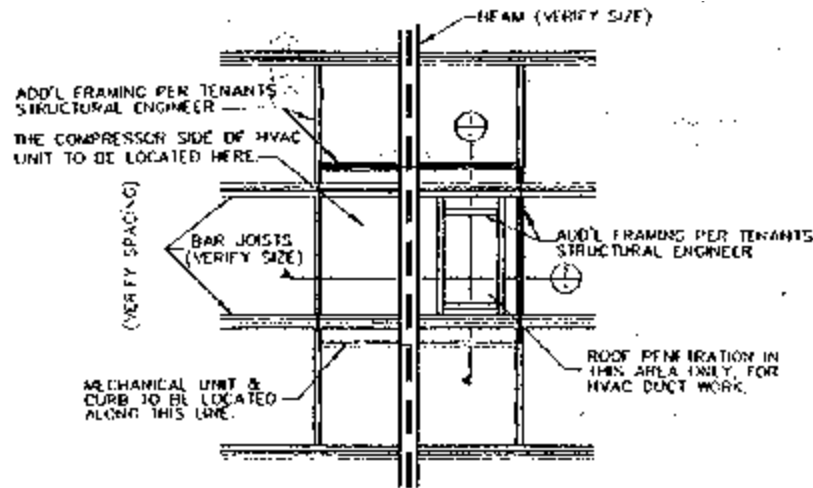
B. Temporary Light and Power

1. Each tenant shall be responsible for installation and removal of temporary light and power within their shop.
2. The Tenant shall pay a charge for temporary light and power as agreed with Landlord at the time of signing his lease.
3. Each tenant's electrical contractor must install feeder conductors from Landlord service distribution point immediately, so that it may be used as a source of temporary light and power for all tenant contractors within each shop.
4. Landlord will provide power to above distribution point.

EXIT CORRIDORS

Distribution of utilities through a newly constructed or an altered exit passageway is prohibited except for equipment and ductwork specifically serving the exit passageway, sprinkler piping, standpipes, electrical raceway for fire department communication and electrical raceway serving the exit passageway.

DETAIL DRAWINGS



HVAC FRAMING LAYOUT

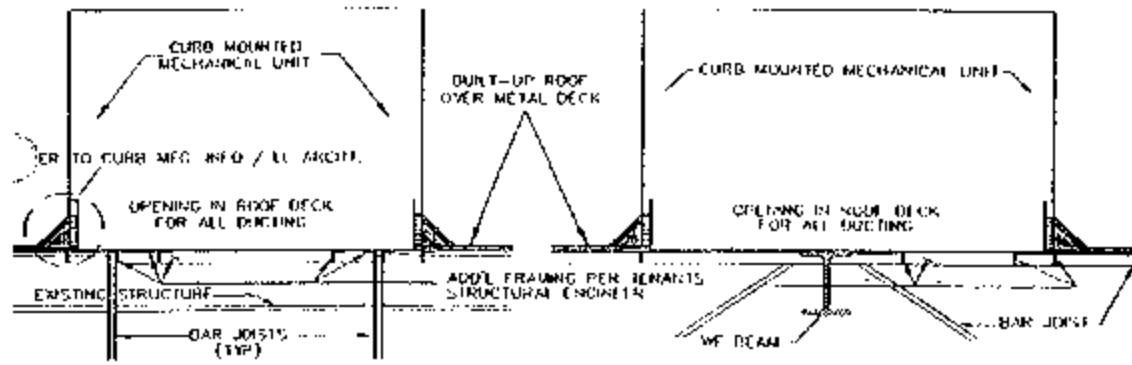
NOT TO SCALE

VAC NOTES:

THE HVAC UNIT SHALL BE LOCATED OVER A STRUCTURAL BEAM. DO NOT REMOVE ANY STRUCTURAL OR ANY MISC. STEEL INCLUDING BRIDGING AND OR BLOCKING. THE TENANT IS RESPONSIBLE TO PROVIDE VERIFICATION BY A STRUCTURAL ENGINEER THAT THE HVAC UNIT IS ADEQUATELY SUPPORTED. IF ANY OF THE REQUIREMENTS CAN NOT BE ACHIEVED, IT IS THE TENANTS RESPONSIBILITY TO NOTIFY THE LANDLORD IN WRITING AND SUBMIT AN ALTERNATE PLAN. DETAILS ON THIS SHEET DO NOT NECESSARILY APPLY TO ALL TENANT SPACES. TENANTS MUST VERIFY WHICH CONDITIONS EXIST IN THEIR OWN LOCATION.

NOTE:

DETAILS ON THIS SHEET DO NOT NECESSARILY APPLY TO ALL TENANT SPACES. TENANTS MUST VERIFY WHICH CONDITIONS EXIST IN THEIR OWN LOCATIONS.



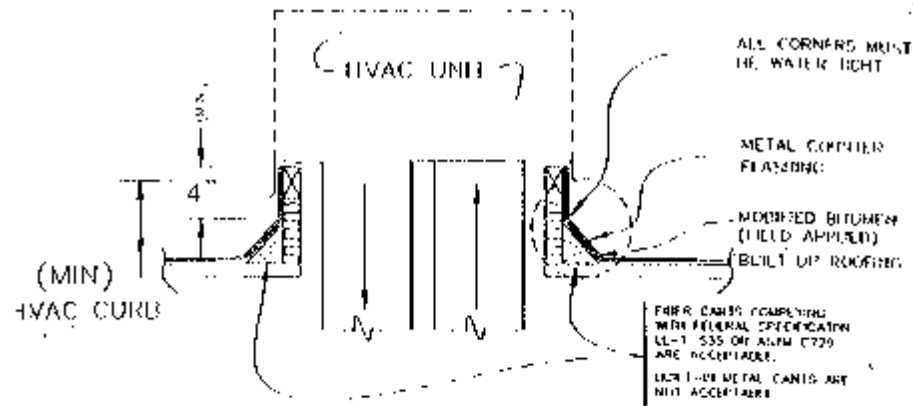
SECTION (1)

NOT TO SCALE

SECTION (2)

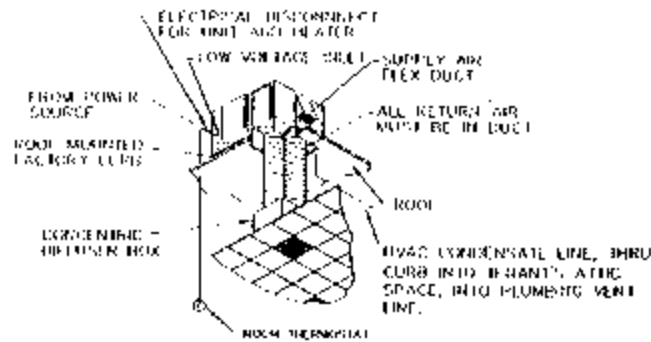
NOT TO SCALE

DETAIL DRAWINGS (cont'd.)



CURB DETAIL

HVAC PENETRATION THROUGH CURB WITH REMAINING CURB

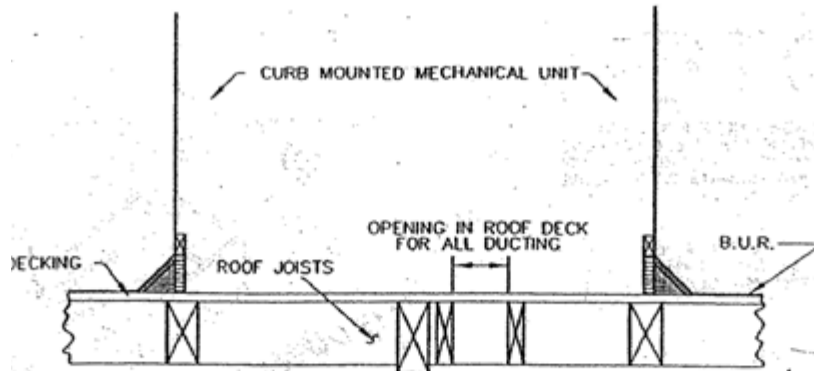


MECHANICAL UNIT

NOTE:

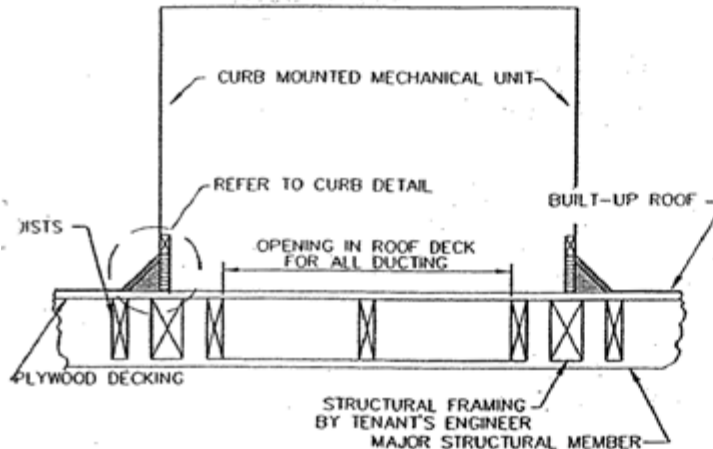
"TRADES ON THIS SHEET DO NOT NECESSARILY APPLY TO ALL TRADES. TENANTS WITH OTHER WORK CONDITIONS MUST INquire FOR DETAILS."

DETAIL DRAWINGS (cont'd.)



SECTION 2

NOT TO SCALE



SECTION 1

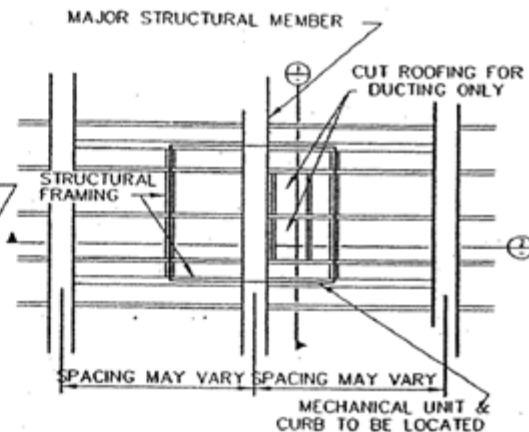
NOT TO SCALE

HVAC NOTES:

1. THE HVAC UNIT SHALL BE LOCATED OVER A STRUCTURAL BEAM.
2. DO NOT REMOVE ANY STRUCTURAL OR ANY MISC. STEEL INCLUDING BRIDGING AND OR BLOCKING.
3. THE TENANT IS RESPONSIBLE TO PROVIDE VERIFICATION BY A STRUCTURAL ENGINEER THAT THE HVAC UNIT IS ADEQUATELY SUPPORTED.
4. IF ANY OF THE REQUIREMENTS CAN NOT BE ACHIEVED, IT IS THE TENANT'S RESPONSIBILITY TO NOTIFY THE LANDLORD IN WRITING AND SUBMIT AN ALTERNATE PLAN.
5. DETAILS ON THIS SHEET DO NOT NECESSARILY APPLY TO ALL TENANT SPACES. TENANTS MUST VERIFY WHICH CONDITIONS EXIST IN THEIR OWN LOCATION.

NOTE:

DETAILS ON THIS SHEET DO NOT NECESSARILY APPLY TO ALL TENANT SPACES. TENANTS MUST VERIFY WHICH CONDITIONS EXIST IN THEIR OWN LOCATIONS.



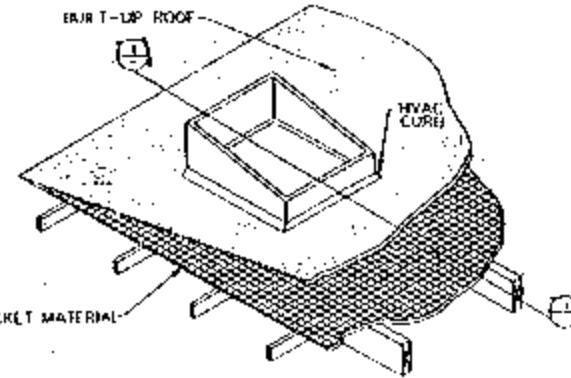
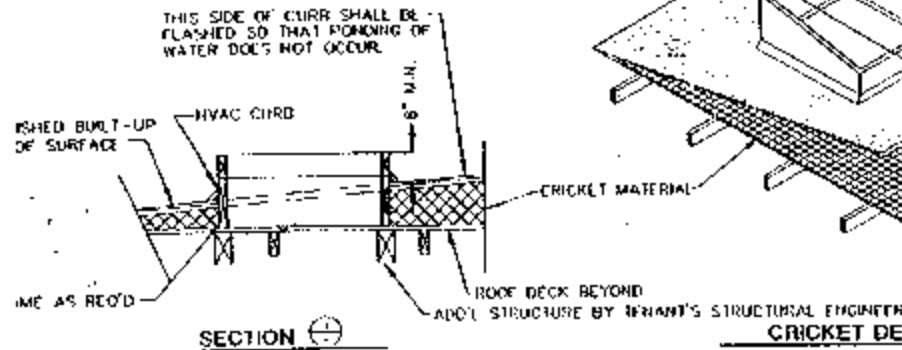
HVAC FRAMING LAYOUT

NOT TO SCALE

DETAIL DRAWINGS (cont'd.)

NOTE:

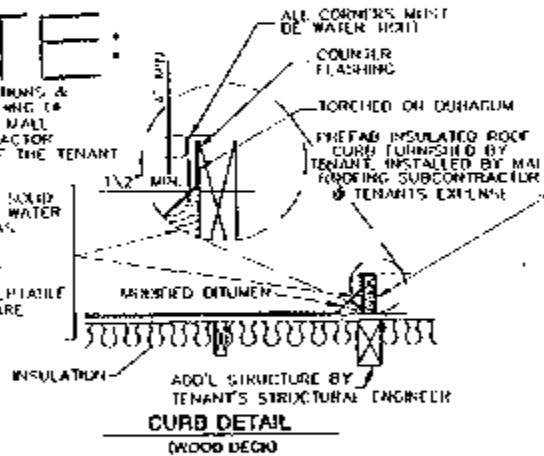
THE CRICKET SHOWN HERE DOES NOT NECESSARILY REPRESENT ALL CONDITIONS THIS IS AN EXAMPLE ONLY SHOWING CURB INSTALLATION W/A MINIMUM OF 8" ABOVE FINISHED ROOF STRUCTURE.



NOTE:

ALL ROOF PENETRATIONS & CUTTING AND PATCHING OF BUILT-UP ROOF BY MALL ROOFING SUBCONTRACTOR AT THE EXPENSE OF THE TENANT

WOOD CANIS SHALL BE SOLID ROT PROOF WOOD, USING WATER BASE TREATMENT SUCH AS WOLMAN[®] FIBER CANIS COMPLYING WITH FEDERAL SPECIFICATION LL-1-539 OR ASTM C723 ARE ACCEPTABLE BUILT-IN METAL CANIS ARE NOT ACCEPTABLE



WOOD STRUCTURE

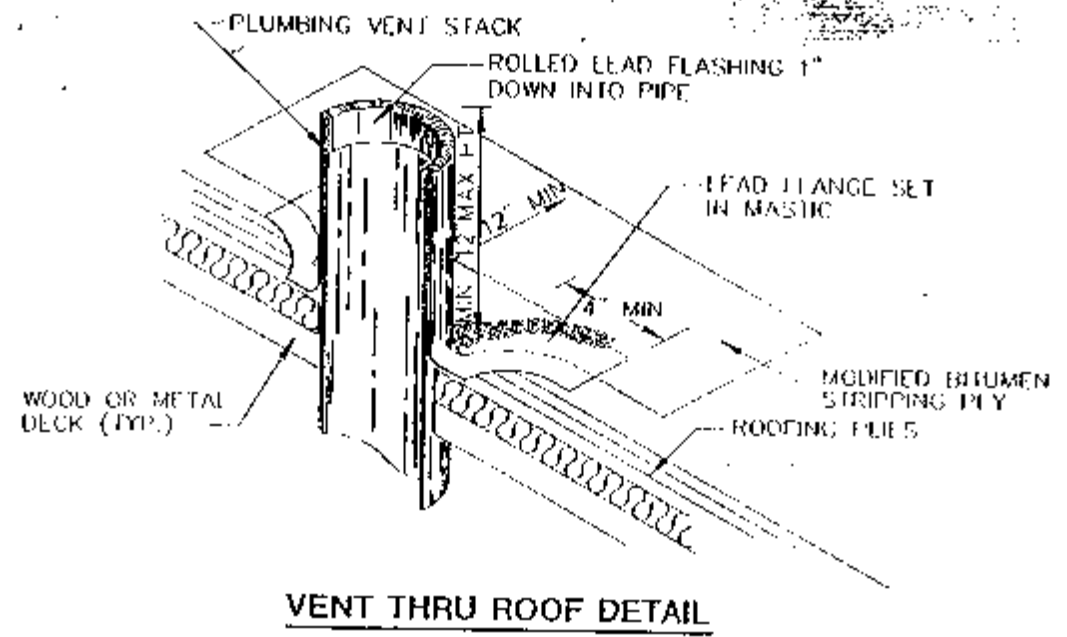
NOTE:

1. DETAILS ON THIS SHEET DO NOT NECESSARILY APPLY TO ALL TENANT SPACES. TENANTS MUST VERIFY WHICH CONDITIONS EXIST IN THEIR OWN LOCATIONS.
2. ANY ROOF PENETRATION OVER 100 SQ INCHES WILL BE REINFORCED BY INSTALLING NOT SMALLER THAN A 3" X 3" X 1/4" ANGLE FRAME AROUND OPENING TO SUPPORT A METAL IRON DECK, OR FOR WOOD DECKS USING 4" X 8" FRAMING STUDS. ALSO THE AIR COMPRESSOR SIDE OF AN HVAC UNIT SHALL BE LOCATED OVER A STRUCTURAL MEMBER FOR ADD'L SUPPORT. ONLY USE MALL ROOFER FOR ANY ROOF REPAIRS.
3. THE TENANT MUST CONTRACT WITH AN OUTSIDE HVAC CONTRACTOR FOR THE REGULAR REPAIR AND MAINTENANCE OF THE SYSTEM AND MINIMUM FROM OF SUCH CONTRACT TO THE LANDLORD.

DETAIL DRAWINGS (cont'd.)


- NOTES:**
1. ALL ROOF PENETRATIONS SHALL BE MADE BY MALL ROOFING SUBCONTRACTOR AT TENANT'S EXPENSE.
 2. SHEET LEAD MIN. OF 2 1/2 LB. PER SQ. FT.

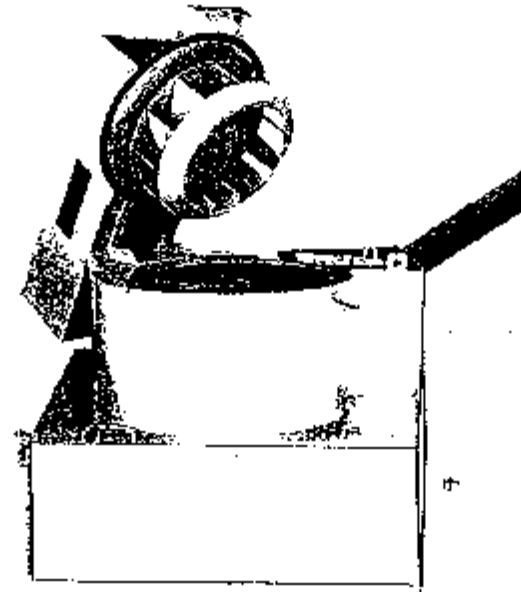
NOTE
 DETAILS ON THIS SHEET DO NOT NECESSARILY APPLY TO ALL TENANT SPACES. TENANTS MUST VERIFY WHICH CONDITIONS EXIST IN THEIR OWN LOCATIONS.



EXHAUST BLOWER DETAILS

SUPREME[®]
GBD **HEAVY-DUTY CURB-MOUNTED EXHAUST BLOWER**
designed for restaurant grease removal and high-static industrial applications

 PATENT PENDING



EXPERIENCE THE SUPREME[®] DIFFERENCE.

EXHAUST BLOWER DETAILS (cont'd.)

MODEL: **GBD**
 DRAWN BY: **JMD**
 NOTES: **PATENT PENDING**

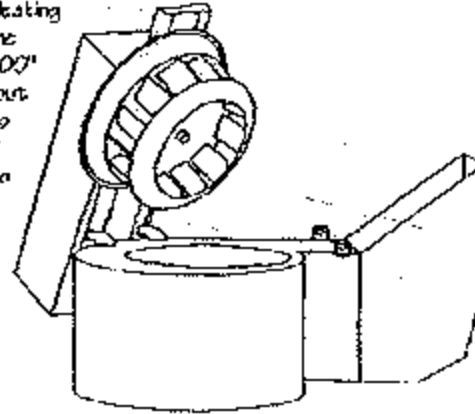
Heavy-duty cast-iron motor
 cast-iron motor
 for resistance to grease, corrosion,
 and high static voltages

SUPREME®

2

FAN WHEEL

The fan wheel is constructed of heavy-gauge aluminum or steel and is backwardly inclined and non-overloading. The wheel is designed to throw particulate off its blades into the exhauster as it spins instead of building up on the wheel and the heads of the fan. This prevents the leaking of grease onto the roof common with other types of fans. The standard Supreme wheel is capable of exhausting at over 5,000 W.C. Consult factory for higher-static applications. The lift-out wheel used on the GBD is counter-balanced, and designed to lift out of the fan assembly. By inserting the safety lockout pin, the wheel will remain out of the way until you are ready to place the wheel back into the assembly. This allows easy cleaning and maintenance, unlike spun aluminum-type fans or utility sets. Routine maintenance, such as checking bearings that would require a complete disassembly of other fans, with the possibility of damaged or lost parts, is instead a simple task with the Supreme GBD.



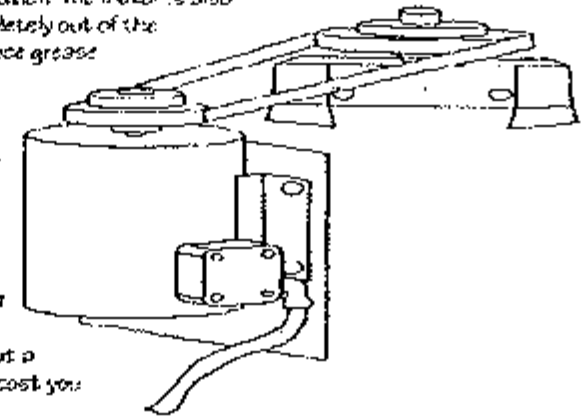
HEAVY-DUTY BEARINGS

Bearings used on GBD blowers are durable pillow-block, ball-bearing type, with zerk fittings for effortless lubrication. Instead of the lighter-duty bearings commonly found on other types of fans.



MOTOR

The motors used on all Supreme Fan Products are energy efficient, and are rated for continuous duty operation. The motor is also maintenance-friendly. It's completely out of the grease-laden airstream to reduce grease buildup and excessive heat on precision motor parts. It is readily accessible for maintenance, by simply opening the motor cover, which can be done without the use of tools. Your service technician can then do all the needed work: lubricate the bearings, change a belt, and check out the operation of the system, without a "major service call" that would cost you both time and money.



Supreme Fan Products certifies that the GBD exhaust blowers shown herein is licensed to bear the AMCA seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 231 and comply with the requirements of the AMCA Certified Ratings Program.

EXHAUST BLOWER DETAILS (cont'd.)

HOUSING

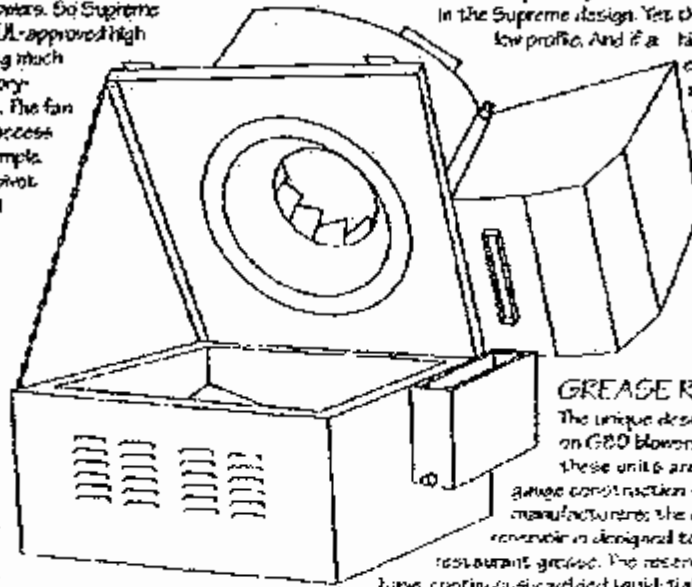
The housing is made of heavy 10- to 16-gauge steel, and is continuously welded liquid-tight for strength and to prevent grease leakage. Grease tends to stick to the spun aluminum used in other brands of exhaust blowers. So Supreme covers the entire unit with UL-approved high gloss paint to make cleaning much easier. Lifting legs are factory-installed for ease of rigging. The fan housing is hinged to make access and cleaning of ductwork simple. The stainless steel hinges pivot the fan housing, and welded steel stops hold the fan in place.

BASE

The bases available for GBD blowers are fabricated from heavy-gauge steel, and are continuously welded for strength and durability. Bases are available in vented or non-vented styles. The bases are reinforced at hinging points for extra strength.

DISCHARGE SCOOP

The discharge scoop used on the GBD blowers is continuously welded to the blower housing to prevent grease leakage. The scoop design allows you to place the blower unit closer to the outside wall than would be possible with a spun aluminum-type fan. Code-required separations between rooftop air intake systems and exhausts are easy with GBD blowers, because the unit can be oriented in any of four directions as needed; the windward required by other brands of fans is not involved in the Supreme design. Yet the GBD blower has a very low profile. And if a higher scoop is needed to extend the discharge above the roof line, Supreme can provide it.



GREASE RESERVOIR

The unique design of the grease reservoir on GBD blowers is another part of why these units are Supreme. Its heavy-gauge construction separates it from other manufacturers; the extra large Supreme reservoir is designed to separate water from real restaurant grease. The reservoir is integral to the fan base, continuously welded liquid-tight, and is designed to handle large amounts of liquid at once, making even rush times a breeze for the GBD. Water and snow are allowed to separate from the grease, and run off onto the roof, while the grease is trapped in the reservoir. The reservoir is provided with a brass ball valve for ease of draining. The liquids can be optionally piped to a code-approved receptor, eliminating the need for rooftop maintenance of the reservoir.

OPTIONAL EQUIPMENT

EXTENDED DISCHARGE SCOOP

The optional extended discharge scoop is available if a greater distance is required between the exhaust and supply inlets in order to meet code requirements or job-site conditions. The single outlet discharge on the GBD makes this separation easier.

ROOF CURB

If requested, Supreme can provide an optional all-steel roof curb for the GBD, designed for easy, weather-proof mounting.

SIDE INLET FITTING

Unlike other manufacturers, if horizontal rooftop ductwork is required, Supreme offers the option of a continuously-welded, grease-tight, side inlet fitting, incorporated into the base of the GBD. This option is needed if ductwork is to be run horizontally into the fan. See page 9.

TRANSITION FUNNEL FITTING

A funnel fitting to connect ductwork from the fan inlet to the exhaust duct is available. It is constructed of 16-gauge galvanized material, and is continuously welded to make a liquid-tight connection to the blower unit. Provides exact size when ordering. See page 8.

DISCONNECT SWITCHES AND CONTROL PANELS

A complete line of disconnect switches are available, factory-installed and pre-wired. Switches can be provided either fused or non-fused and with magnetic starters. Supreme also offers UL-listed motor control panels, capable of handling from one to ten motors, providing integral interlocking overload protection, magnetic starters and service disconnects.

EXHAUST BLOWER DETAILS (cont'd.)

SHORT FORM SPECIFICATIONS & GREASE DRAINING METHOD

GBD

PATENT PENDING

SHORT FORM SPECIFICATIONS

GBD exhaust blowers shall be curb-mounted, with fan housing entirely constructed of heavy-gauge steel, fully welded. Blower shall have a single, integral, continuously-welded upblast discharge scoop constructed of similar materials, with a fully welded drain for liquid to travel to a fully welded steel grease reservoir. Reservoir shall be permanently mounted to the base under the discharge scoop, and shall be designed to allow water to escape while retaining grease in the reservoir. Grease shall be drained by the use of a brass single-throw ball valve.

The entire unit shall be painted with UL-approved gloss paint. Supreme Fan can provide a full range of coatings for various applications. Consult factory for details.

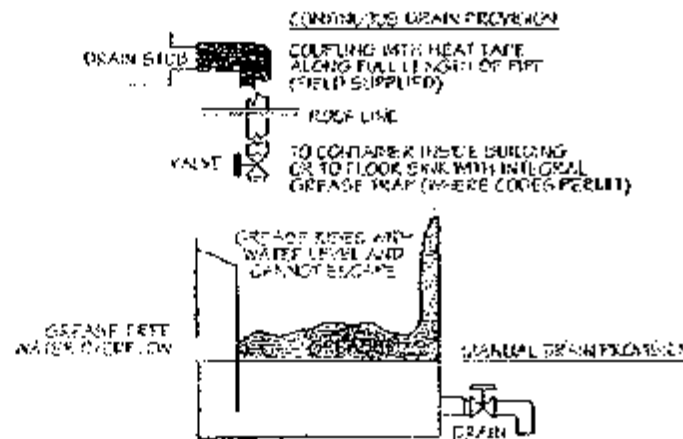
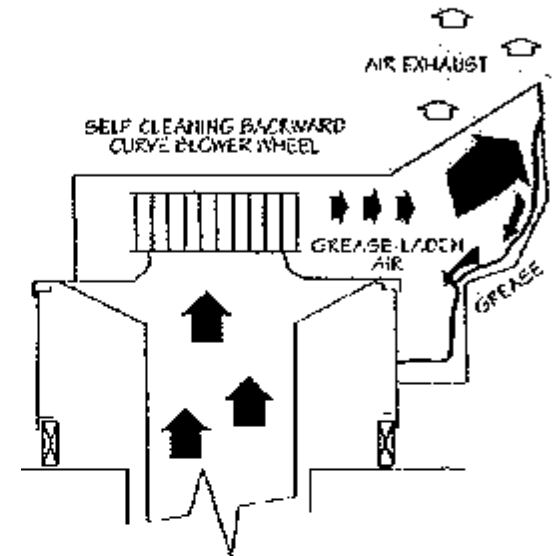
Blower shall have a counter-balanced, lift-out fan wheel, including a safety lockout pin to prevent the wheel from dropping during maintenance. Fan wheel shall be constructed from heavy-duty, welded aluminum or steel, and shall be backward-inclined, statically and dynamically balanced, and of a non-overloading type.

Fan motor shall be mounted out of the air stream on a heavy-gauge welded angle iron frame. Motor shall be a continuous-duty, energy-efficient type. Motor, belt and pulley assembly shall be factory set for static pressure, revolutions per minute and cubic feet per minute requirements, whenever possible.

Entire blower shall be base-mounted and hinged, so that the unit may be tilted upward for cleaning of exhaust duct system. Unit shall be equipped with a safety chain to prevent damage during the cleaning operation.

Motor cover shall be constructed from steel and shall be easily opened for maintenance without the use of tools. Wheel shafts shall be 10/45 TDSF material. Bearings shall be heavy-duty pillow-block ball bearing type with zerol fittings for lubrication. Blower shall be AMCA licensed and listed for CFM, RPM, static pressure and brake horsepower performance, as well as being UL listed for restaurant grease applications.

HOW THE SUPREME GBD CAPTURES GREASE



Drain the grease reservoir once per month. Restaurants with heavy grease-producing cooking may require more frequent draining. To drain the grease reservoir, place a large container (minimum 5 1/2 gallons) with a sturdy handle under the drain spigot and open the valve.

NOTE: The reservoir has a 3 gallon capacity before the overflow, 5 1/2 gallons if the overflow outlet becomes plugged.

EXHAUST BLOWER DETAILS (cont'd.)

OTHER PRODUCTS FROM



MOTOR CONTROL PANELS



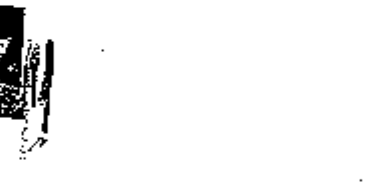
**CABINET SUPPLY FAN
MODEL SF**



**COMBINATION SUPPLY
AND EXHAUST PACKAGE**



**FORWARD CURVE BLOWER
MODEL FC**



**BACKWARD-INCLINED BLOWER
MODEL BI**